AMENDED CLAIMS

[received by the International Bureau on 17 June 2005 (17.06.2005);
original claims 1-5 replaced by amended claims 1-6]

Claims.

1. Method for tightening a screw joint to a desired target torque level by means of an impulse wrench having an impulse unit with a motor driven inertia drive member, and a programmable control unit arranged to control the power supply to the impulse wrench according to the following steps:

- starting a screw joint tightening process at a reduced power supply to the impulse wrench,
- determining the instantaneous torque magnitude and calculating the torque growth during a number of delivered impulses,
- increasing after the very first delivered impulse the power supply to the impulse wrench in response to the calculated torque growth.
- reducing the power supply to the impulse wrench in response to the instantaneous torque magnitude and to the calculated torque growth during each impulse after the instantaneous torque magnitude has reached a predetermined part of the desired target torque level, and
- interrupting the power supply to the impulse wrench as the target torque level has been reached.

2. Method according to claim 1, wherein the power supply is increased after the very first delivered impulse to an optimum magnitude determined by the calculated relative torque growth and the installed torque magnitude during the very first delivered impulse in relation to the target torque level.

3. Method according to claim 1 or 2, wherein the angular displacement and retardation magnitude of the inertia drive member during each delivered impulse is ascertained and the instantaneous torque magnitude is calculated therefrom.

4. Power wrench system for tightening a screw joint to a desired target torque level, comprising a torque impulse wrench, a programmable control unit, and a power supply means connected to the impulse wrench and governed by the control unit, wherein the impulse wrench comprises an impulse unit with a motor driven inertia drive member, and a angle sensing means is connected to said inertia drive member to detect the angular movement of said inertia drive member,
c h a r a c t e r i z e d in that

- said power supply means is controlled to supply the impulse wrench with a reduced power until the very first impulse is delivered to the screw joint being worked,
- said control unit is arranged to receive signals from the angle sensing means and to determine the angular displacement and the retardation magnitude of the inertia drive member during each delivered impulse, and to calculate the delivered torque as well as the torque growth per angle increment during each impulse, and
- said control unit is arranged to increase the power supply to the impulse wrench after the very first impulse has been delivered, to reduce the power supply to the impulse wrench as the instantaneous torque magnitude has reached a predetermined part of the target torque level, and to interrupt the power supply to the impulse wrench as the target torque level has been reached.

5. Power wrench system according to claim 4, wherein the impulse wrench is pneumatically powered, and said power supply means comprises a valve connected to the control unit and arranged to vary the pressure air supply to the impulse wrench between zero and a full power flow as determined by the control unit.

6. Power tool system for screw joint tightening, comprising a pneumatic impulse wrench (10), and a control unit (22) programmable according to a desired tightening strategy including a set value or values of one or more tightening parameters of a target torque level, wherein said impulse wrench (10) includes a pressure air driven motor (11) with a rotor (12), an impulse unit (13) with an inertia drive member (14) connected to the motor rotor (12), and a pressure air supply means (25,26) connected to the motor (11),
c h a r a c t e r i z e d in that

- an angle encoder (16) is connected to the control unit (22) and arranged to detect the angular movement of said inertia drive member (14),
- said control unit (22) comprising a means for ascertaining during tightening and based on the detected angular movement of said inertia drive member (14) the instantaneous value or values of one or more tightening parameters at each torque impulse and for comparing the instantaneous parameter value or values with the set parameter value or values of the target torque level, and
- said pressure air supply means (25,26) is connected to the control unit (22) and comprising a flow regulating device (26) which is arranged to successively adjust during tightening the pressure air flow to the motor (11) in a range between zero and full power flow as determined by the control unit (22).